

## CHAPTER 5

### SUMMARY AND CONCLUSIONS

#### 5.1 SUMMARY

Coastal zone is the triple interface of land, ocean and atmosphere. The interactions between various natural processes and human activities are important factors in the coastal area. The present study is carried out with a view to understand the sediment dynamics and interaction of coastal structures with coastal processes along Mangalore Coast. The various conventional data utilised in the study includes beach face sediments data, sea sled survey data, leadline survey data and sea bed sediments data. Digital satellite data and imagery of IRS - IA/IB, P4 were used.

From the analysis of conventional and satellite data for Mangalore Coast, the important observations are listed as follows :

Data and Analysis	Inferences
<b>A. CONVENTIONAL DATA</b>	
Beach face sediment samples data	<ul style="list-style-type: none"> <li>• Net alongshore sediment transport is insignificant. Sediments are moving equally on either side of Mulky-Pavanje river mouth.</li> </ul>

Data and Analysis	Inferences
	<ul style="list-style-type: none"> <li>• Deposition on the Bengre spit is due to predominant movement of sediments towards North from the Netravati-Gurpur river mouth.</li> <li>• No large scale erosion/ deposition of sand at the NMP breakwaters.</li> </ul>
Sea sled survey data	<ul style="list-style-type: none"> <li>• Seawalls constructed along Mangalore coast are not in the active zone of the beach.</li> <li>• 'Seawall causes erosion' and 'Seawall accelerate erosion' are disproved. Armored and unarmored beaches recovered in the same time period.</li> <li>• Dynamic equilibrium of the beaches maintained by the waves are confirmed.</li> <li>• Absence of end-of-wall effect confirms the negligible 'littoral drift' in the study area.</li> </ul>
Leadline survey data	<ul style="list-style-type: none"> <li>• Sea bed contours on either side of NMP breakwaters are parallel to the shoreline.</li> </ul>

Data and Analysis	Inferences
	<ul style="list-style-type: none"> <li>Bathymetry before and after the construction of NMP breakwaters does not change. Also absence of large scale erosion or deposition indicates the negligible littoral drift along the Mangalore Coast.</li> </ul>
Sea bed sediments data	<ul style="list-style-type: none"> <li>The percentage of silt and clay along the approach channel, lagoon and beyond -5 m contour is 95% and sand is 5%.</li> <li>The percentage of sand between baseline and -5 m contour is 95% and the remaining (5%) silt and clay.</li> </ul>
	<ul style="list-style-type: none"> <li>The material available in the approach channel and lagoon is sea bed sediments, deposited due to onshore-offshore sediment transport, and not due to alongshore transport, which confirms the negligible littoral drift along Mangalore Coast.</li> </ul>
<b>B. SATELLITE DATA</b>	
<i>In-situ</i> and IRS-P4 data	<ul style="list-style-type: none"> <li>Sediment transport is from North to South during pre-monsoon season and vice-versa during post-monsoon season, coinciding with the general currents pattern.</li> </ul>

Data and Analysis	Inferences
	<ul style="list-style-type: none"> <li>• The accuracy analysis indicates that the algorithm developed to estimate SSC using IRS-P4 OCM and <i>in-situ</i> data is satisfactory.</li> <li>• Bands B3, B5 and B6 of OCM are highly suitable for estimating SSC.</li> </ul>
IRS-1A/1B	<ul style="list-style-type: none"> <li>• Periodic shifting of river mouth is clearly observed.</li> <li>• Deposition on the northern (Bengre) sand spit is due to the sediment brought in by the two rivers viz., Netravati and Gurpur and not due to littoral drift.</li> <li>• The predominant movement of sediment towards North is observed long before the construction of breakwaters, at Netravati-Gurpur river mouth.</li> </ul>
	<ul style="list-style-type: none"> <li>• Mulky-Pavanje river mouth is almost stabilized and net volume of sand deposition is more than the erosion.</li> <li>• Remotely sensed data can be used to detect the dynamic changes of river mouth.</li> </ul>

## 5.2 CONCLUSIONS

From the above observations, the conclusions of the present study are as follows :

- Littoral drift in the study area is insignificant. Net sediment transport is very small.
- Seawalls constructed along the Mangalore Coast are not affecting the beach profile and beach recovery processes either in front of them or on the neighbouring beaches.
- There is no significant changes in the bathymetry and shoreline configuration in the vicinity of NMP due to breakwaters.
- Siltation in the outer approach channel and lagoon of NMP is due to the offshore - onshore movement of sediments.
- The estimation of SSC using an algorithm based on OCM data for Mangalore Coast is satisfactory.

## 5.3 SCOPE FOR THE FUTURE WORK

- The transport pathways of dredged material of NMP from dumping site may be studied using STM.
- Near shore circulation pattern i.e., both longshore current and rip currents in front of walls, reflection of oblique incident waves, and end effects may be attempted.

- Profiles may be studied immediately after seawall construction, at frequent intervals.
- Beach profiles before and after the major storms, along with the wave hydrodynamics data may be analysed.
- Multidate satellite data at frequent intervals may be studied to find the seasonal changes of the suspended sediment concentrations.
- Bathymetric details and physical oceanographic parameters may be derived from satellite data which can be combined with the conventional data to study the coastal processes.